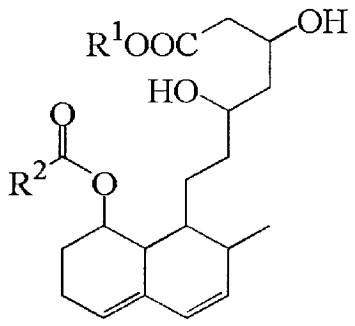
AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (withdrawn) A protein which is derived from a microorganism belonging to the genus *Bacillus*, and has an activity of producing compound (II-a) or compound (II-b) from compound (I-a) or compound (I-b),

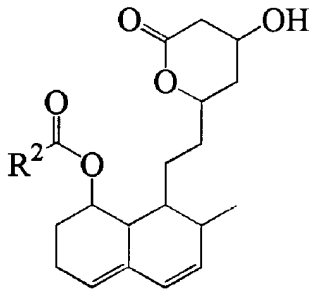
wherein the compound (I-a) is a compound represented by the formula (I-a):



(I-a)

wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl;

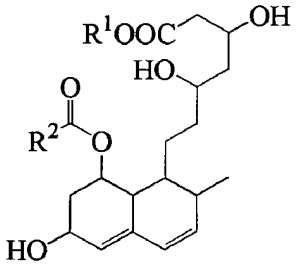
the compound (I-b) is a lactone form of compound (I-a) and is represented by the formula (I-b):



(I-b)

wherein R^2 has the same definition as the above;

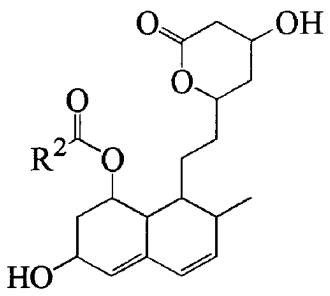
the compound (II-a) is a compound represented by the formula (II-a):



(II-a)

wherein R^1 and R^2 have the same definitions as the above; and

the compound (II-b) is a lactone form of compound (II-a) and is represented by the formula (II-b):

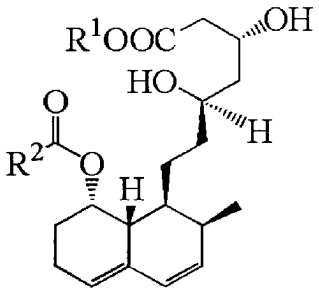


(II-b)

wherein R^2 has the same definition as the above.

2. (withdrawn) A protein which is derived from a microorganism belonging to the genus *Bacillus*, and has an activity of producing compound (IV-a) or compound (IV-b) from compound (III-a) or compound (III-b),

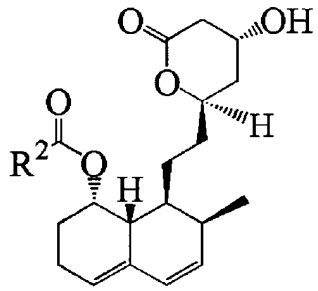
wherein the compound (III-a) is a compound represented by the formula (III-a):



(III-a)

wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl;

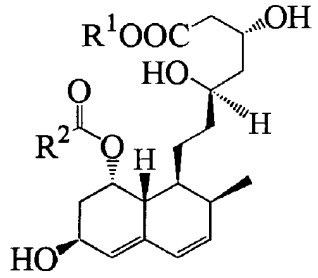
the compound (III-b) is a lactone form of compound (III-a) and is represented by the formula (III-b):



(III-b)

wherein R^2 has the same definition as the above;

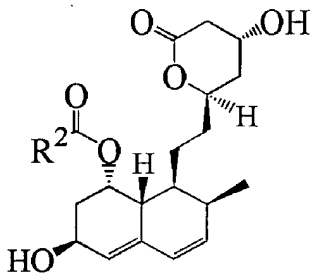
the compound (IV-a) is a compound represented by the formula (IV-a):



(IV-a)

wherein R^1 and R^2 have the same definitions as the above; and

the compound (IV-b) is a lactone form of compound (IV-a) and is represented by the formula (IV-b):

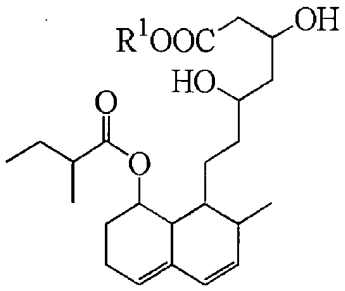


(IV-b)

wherein R^2 has the same definition as the above.

3. (withdrawn) A protein which is derived from a microorganism belonging to the genus *Bacillus*, and has an activity of producing compound (VI-a) or compound (VI-b) from compound (V-a) or compound (V-b),

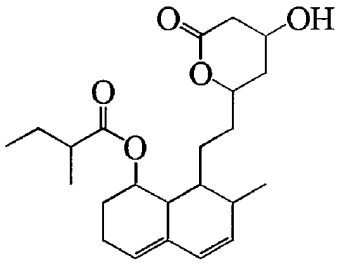
wherein the compound (V-a) is a compound represented by the formula (V-a):



(V-a)

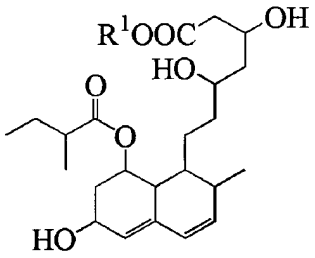
wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal;

the compound (V-b) is a lactone form of compound (V-a) and is represented by the formula (V-b):



(V-b)

the compound (VI-a) is a compound represented by the formula (VI-a):

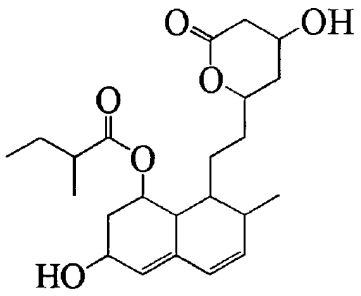


(VI-a)

wherein R^1 has the same definition as the above; and

the compound (VI-b) is a lactone form of the compound (VI-a) and is represented by the

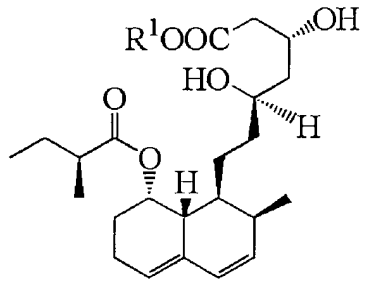
formula (VI-b):



(VI-b)

4. (withdrawn) A protein which is derived from a microorganism belonging to the genus *Bacillus*, and has an activity of producing compound (VIII-a) or compound (VIII-b) from compound (VII-a) or compound (VII-b),

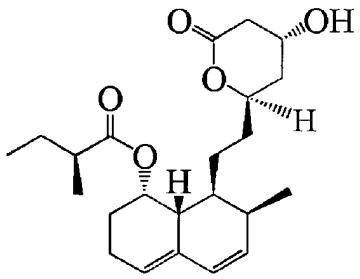
wherein the compound (VII-a) is a compound represented by the formula (VII-a) :



(VII-a)

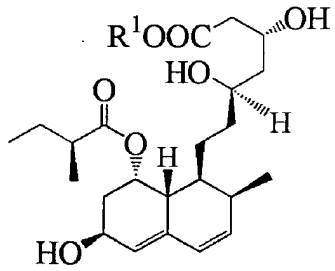
wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal;

the compound (VII-b) is a lactone form of compound (VII-a) and is represented by the formula (VII-b):



(VII-b)

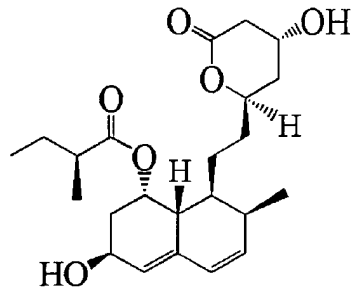
the compound (VIII-a) is a compound represented by the formula (VIII-a):



(VIII-a)

wherein R^1 has the same definition as the above; and

the compound (VIII-b) is a lactone form of compound (VIII-a) and is represented by the formula (VIII-b):



(VIII-b)

5. (withdrawn) The protein according to claim 1, wherein the microorganism belonging to the genus *Baccillus* is a microorganism selected from *B. subtilis*, *B. megaterium, B. laterosporus, B. sphaericus, B. pumilus, B. stearothermophilus, B. cereus,*

B. badius, B. brevis, B. alvei, B. circulans and B. macerans.

6. (withdrawn) The protein according to claim 1, wherein the microorganism belonging to the genus *Baccillus* is a microorganism selected from *B. subtilis* ATCC6051, *B. megaterium* ATCC10778, *B. megaterium* ATCC11562, *B. megaterium* ATCC13402, *B. megaterium* ATCC15177, *B. megaterium* ATCC15450, *B. megaterium* ATCC19213, *B. megaterium* IAM1032, *B. laterosporus* ATCC4517, *B. pumilus* FERM BP-2064, *B. badius* ATCC14574, *B. brevis* NRRL B-8029, *B. alvei* ATCC6344, *B. circulans* NTCT-2610, *and B. macerans* NCIMB-9368.

7. (withdrawn) The protein according to claim 1, wherein the microorganism belonging to the genus *Bacillus* is a microorganism selected from *Bacillus sp.* FERM BP-6029 or *Bacillus sp.* FERM BP-6030.

8. (withdrawn) A protein having the amino acid sequence shown by SEQ ID NO: 1.

9. (withdrawn) A protein which has an amino acid sequence comprising deletion, substitution or addition of one or more amino acids in the amino acid sequence shown by SEQ ID NO: 1, and has an activity of producing compound (II-a) or compound (II-b) from compound (I-a) or compound (I-b).

10. (withdrawn) The protein according to claim 9, wherein the protein has the

amino acid sequence shown by SEQ ID NO: 42 or 45.

11. (withdrawn) The protein according to claim 9, wherein the compound (I-a) is compound (III-a), the compound (I-b) is compound (III-b), the compound (II-a) is compound (IV-a), and the compound (II-b) is compound (IV-b).

12. (withdrawn) The protein according to claim 9, wherein the compound (I-a) is compound (V-a), the compound (I-b) is compound (V-b), the compound (II-a) is compound (VI-a), and the compound (II-b) is compound (VI-b).

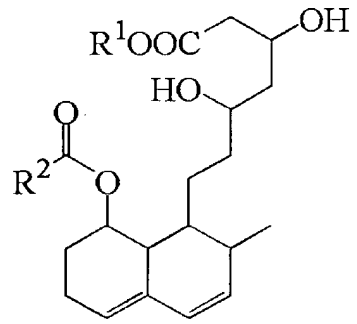
13. (withdrawn) The protein according to claim 9, wherein the compound (I-a) is compound (VII-a), the compound (I-b) is compound (VII-b), the compound (II-a) is compound (VIII-a), and the compound (II-b) is compound (VIII-b).

14. (original) An isolated DNA having the nucleotide sequence shown by SEQ ID NO: 2.

15. (currently amended) An isolated DNA which encodes for a polypeptide consisting of an amino acid sequence having about 99% homology with the amino acid sequence of SEQ ID NO: 1, and ~~hybridizes with the DNA according to claim 14 under stringent conditions, and encodes a protein~~ having an activity of producing compound

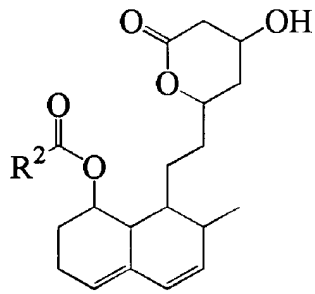
(II-a) or compound (II-b) from compound (I-a) or compound (I-b) wherein,

the compound (I-a) is a compound represented by the formula (I-a):



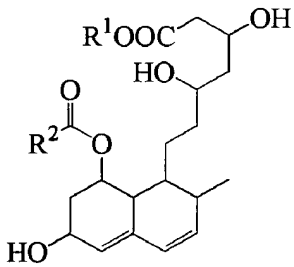
(I-a)

the compound (I-b) is a lactone form of compound (I-a) and is represented by the formula (I-b):



(I-b)

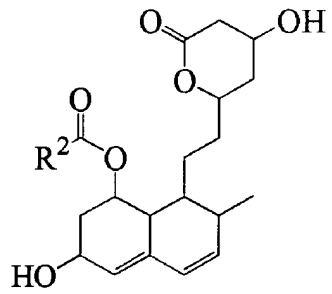
the compound (II-a) is a compound represented by the formula (II-a):



(II-a)

the compound (II-b) is a lactone form of compound (II-a) and is represented by the

formula (II-b):



(II-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl.

16. (original) The DNA according to claim 15, wherein the DNA has a nucleotide sequence selected from the group consisting of the nucleotide sequences shown by SEQ ID NOS: 41, 43 and 44.

17. (withdrawn) An isolated DNA encoding the protein according to claim 1.

18. (withdrawn) The DNA according to claim 15, wherein the compound (I-a) is compound (III-a), the compound (I-b) is compound (III-b), the compound (II-a) is compound (IV-a), and the compound (II-b) is compound (IV-b).

19. (withdrawn) The DNA according to claim 15, wherein the compound (I-a) is compound (V-a), the compound (I-b) is compound (V-b), the compound (II-a) is

compound (VI-a), and the compound (II-b) is compound (VI-b).

20. (withdrawn) The DNA according to claim 15, wherein the compound (I-a) is compound (VII-a), the compound (I-b) is compound (VII-b), the compound (II-a) is compound (VIII-a), and the compound (II-b) is compound (VIII-b).

21. (original) A recombinant DNA vector comprising the DNA according to claim 14.

22. (original) A transformant obtained by introducing the recombinant DNA vector according to claim 21 into a host cell.

23. (original) The transformant according to claim 22, wherein the transformant belongs to a microorganism selected from the genera *Escherichia*, *Bacillus*, *Corynebacterium*, and *Streptomyces*.

24. (previously amended) The transformant according to claim 22, wherein the transformant belongs to microorganism selected from *Escherichia coli, Bacillus subtilis, Bacillus megaterium, Corynebacterium glutamicum, Corynebacterium ammoniagenes, Corynebacterium callunae* and *Streptomyces lividans*.

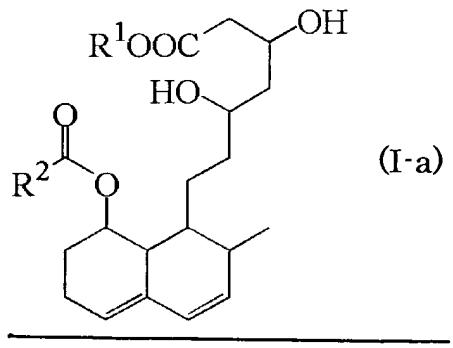
25. (currently amended) A process for producing compound (II-a) or compound (II-b), wherein the transformant according to claim 22, a culture of the transformant, or a treated product of the culture is used as an enzyme source, and the process comprises:

allowing compound (I-a) or compound (I-b) to exist in an aqueous medium in the presence of the enzyme source;

allowing compound (II-a) or compound (II-b) to be produced and accumulated in said aqueous medium; and

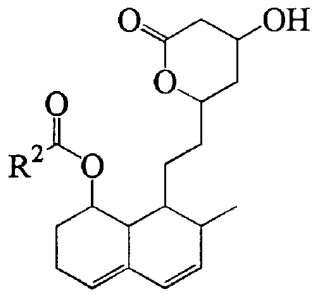
collecting compound (II-a) or compound (II-b) from said aqueous medium wherein,

the compound (I-a) is a compound represented by the formula (I-a) :



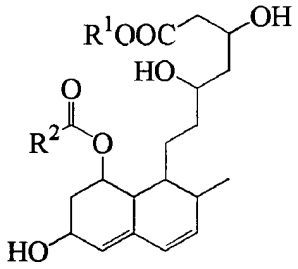
(I-a)

the compound (I-b) is a lactone form of compound (I-a) and is represented by the formula (I-b):



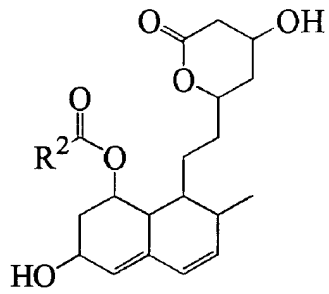
(I-b)

the compound (II-a) is a compound represented by the formula (II-a):



(II-a)

the compound (II-b) is a lactone form of compound (II-a) and is represented by the formula (II-b):



(II-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl.

26. (currently amended) A process for producing compound (IV-a) or

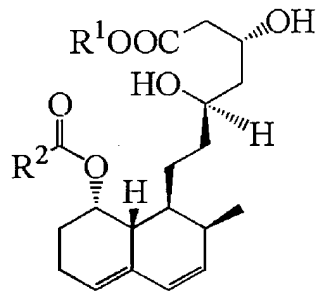
compound (IV-b), wherein the transformant according to claim 22, a culture of the transformant, or a treated product of the culture is used as an enzyme source, and the process comprises:

allowing compound (III-a) or compound (III-b) to exist in an aqueous medium in the presence of the enzyme source;

allowing compound (IV-a) or compound (IV-b) to be produced and accumulated in said aqueous medium; and

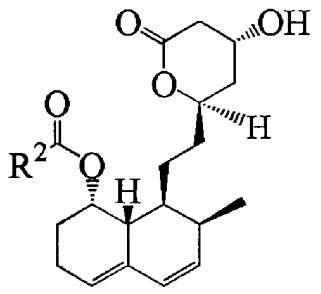
collecting compound (IV-a) or compound (IV-b) from said aqueous medium wherein,

the compound (III-a) is a compound represented by the formula (III-a) :



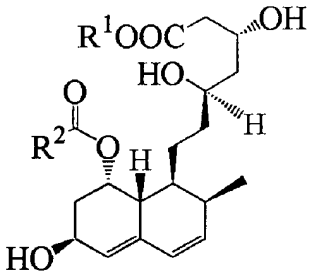
(III-a)

the compound (III-b) is a lactone form of compound (III-a) and is represented by the formula (III-b):



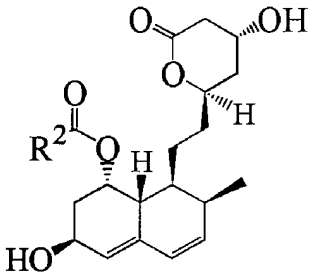
(III-b)

the compound (IV-a) is a compound represented by the formula (IV-a):



(IV-a)

the compound (IV-b) is a lactone form of compound (IV-a) and is represented by the formula (IV-b):



(IV-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl.

27. (currently amended) A process for producing compound (VI-a) or compound (VI-b), wherein the transformant according to claim 22, a culture of the transformant, or a treated product of the culture is used as an enzyme source, and the process comprises:

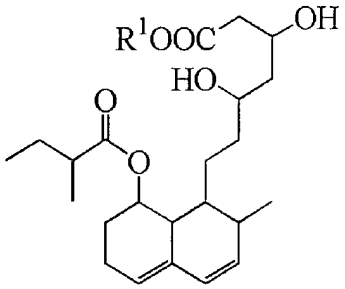
allowing compound (V-a) or compound (V-b) to exist in an aqueous medium in the

presence of the enzyme source;

allowing compound (VI-a) or compound (VI-b) to be produced and accumulated in said aqueous medium; and

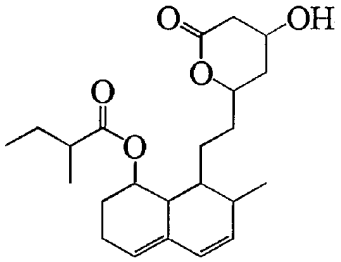
collecting compound (VI-a) or compound (VI-b) from said aqueous medium wherein,

the compound (V-a) is a compound represented by the formula (V-a):



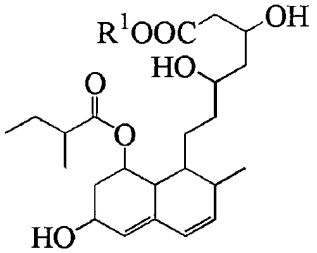
(V-a)

the compound (V-b) is a lactone form of compound (V-a) and is represented by the formula (V-b):



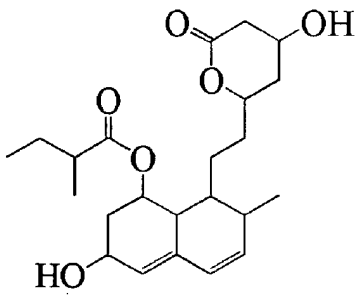
(V-b)

the compound (VI-a) is a compound represented by the formula (VI-a):



(VI-a)

the compound (VI-b) is a lactone form of compound (VI-a) and is represented by the formula (VI-b):



(VI-b)

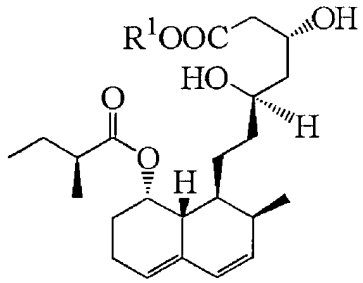
and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal.

28. (currently amended) A process for producing compound (VIII-a) or compound (VIII-b), wherein the transformant according to claim 22, a culture of the transformant, or a treated product of the culture is used as an enzyme source, and the process comprises:

allowing compound (VII-a) or compound (VII-b) to exist in an aqueous medium in the presence of the enzyme source;

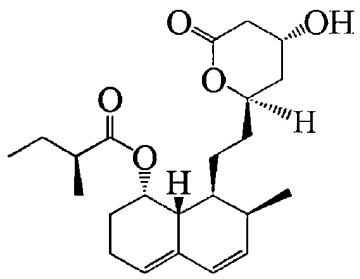
allowing compound (VIII-a) or compound (VIII-b) to be produced and accumulated in said aqueous medium; and

collecting compound (VIII-a) or compound (VIII-b) from said aqueous medium wherein, the compound (VII-a) is a compound represented by the formula (VII-a):



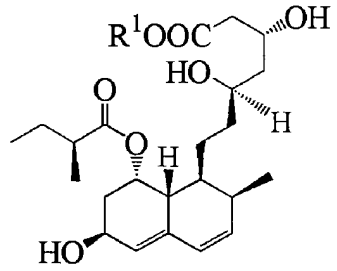
(VII-a)

the compound (VII-b) is a lactone form of compound (VII-a) and is represented by the formula (VII-b):



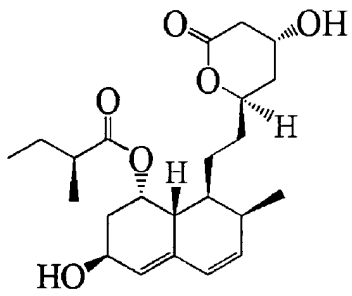
(VII-b)

the compound (VIII-a) is a compound represented by the formula (VIII-a):



(VIII-a)

the compound (VIII-b) is a lactone form of compound (VIII-a) and is represented by the formula (VIII-b):

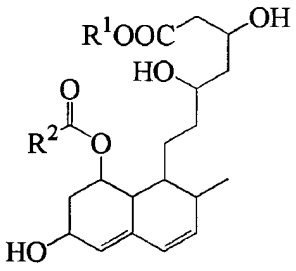


(VIII-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal.

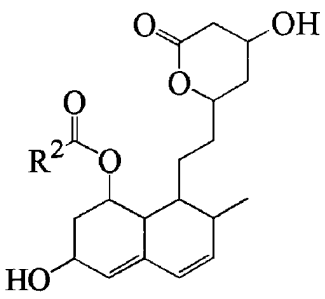
29. (currently amended) The process according to claim 25, wherein the compound (II-b) is ~~the compound (II-b)~~ obtained by forming a ~~lacton~~ lactone from compound (II-a),

the compound (II-a) is a compound represented by the formula (II-a):



(II-a)

the compound (II-b) is a lactone form of compound (II-a) and is represented by the formula (II-b):

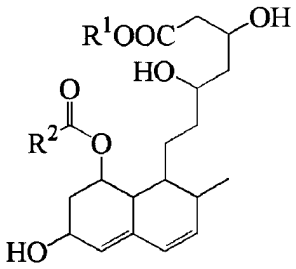


(II-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl.

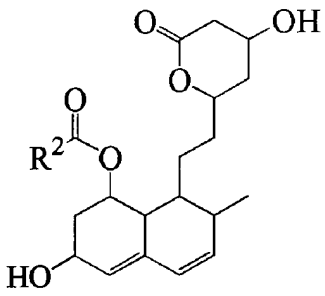
30. (currently amended) The process according to claim 25, wherein the compound (II-a) is ~~the compound (II-a)~~ obtained by opening the lactone ring of compound (II-b),

the compound (II-a) is a compound represented by the formula (II-a):



(II-a)

the compound (II-b) is a lactone form of compound (II-a) and is represented by the formula (II-b):

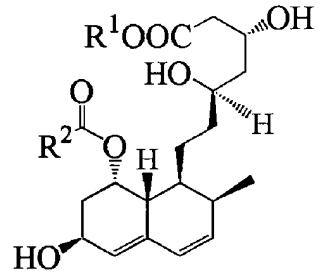


(II-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl.

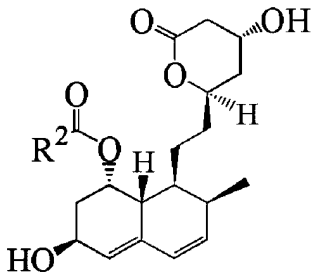
31. (currently amended) The process according to claim 26, wherein the compound (IV-b) is ~~the compound (IV-b)~~ obtained by forming a ~~lacton~~ lactone from compound (IV-a),

the compound (IV-a) is a compound represented by the formula (IV-a):



(IV-a)

the compound (IV-b) is a lactone form of compound (IV-a) and is represented by the formula (IV-b):

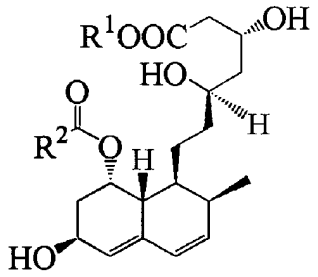


(IV-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl.

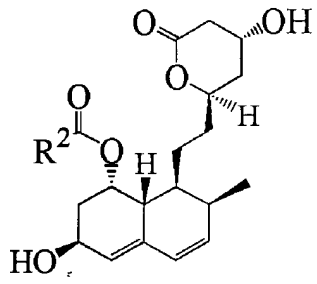
32. (currently amended) The process according to claim 26, wherein the compound (IV-a) is ~~the compound (IV-a)~~ obtained by opening the lactone ring of compound (IV-b),

the compound (IV-a) is a compound represented by the formula (IV-a):



(IV-a)

the compound (IV-b) is a lactone form of compound (IV-a) and is represented by the formula (IV-b):

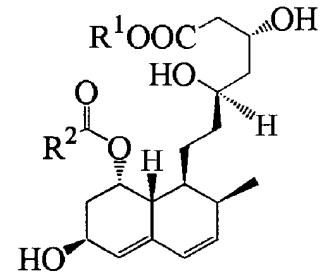


(IV-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl.

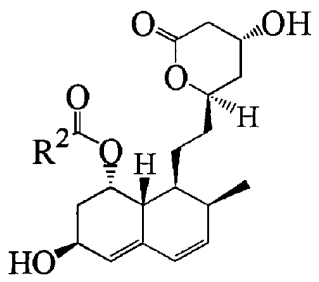
33. (currently amended) The process according to claim 27, wherein the compound (VI-b) is ~~the compound (VI-b)~~ obtained by forming a ~~lacton~~ lactone from compound (VI-a),

the compound (IV-a) is a compound represented by the formula (IV-a):



(IV-a)

the compound (IV-b) is a lactone form of compound (IV-a) and is represented by the formula (IV-b):

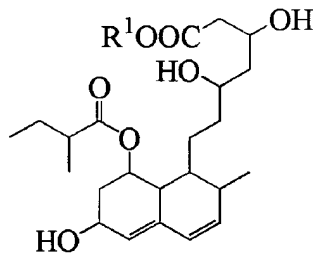


(IV-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal, and R^2 represents a substituted or unsubstituted alkyl, or a substituted or unsubstituted aryl.

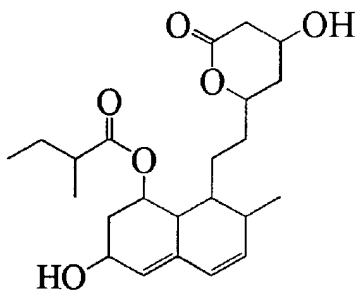
34. (currently amended) The process according to claim 27, wherein the compound (VI-a) is ~~the compound (VI-a)~~ obtained by opening the lactone ring of compound (VI-b),

the compound (VI-a) is a compound represented by the formula (VI-a):



(VI-a)

the compound (VI-b) is a lactone form of compound (VI-a) and is represented by the formula (VI-b):

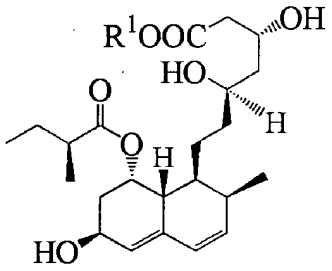


(VI-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal.

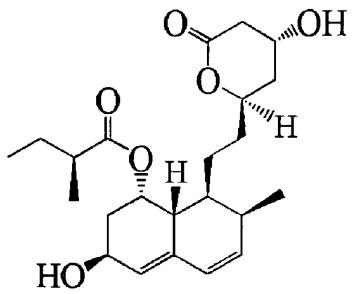
35. (currently amended) The process according to claim 28, wherein the compound (VIII-b) is ~~the compound (VIII-b)~~ obtained by forming a ~~lacton~~ lactone from compound (VIII-a),

the compound (VIII-a) is a compound represented by the formula (VIII-a):



(VIII-a)

the compound (VIII-b) is a lactone form of compound (VIII-a) and is represented by the formula (VIII-b):

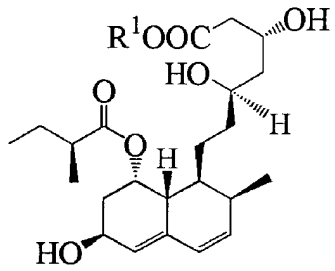


(VIII-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal.

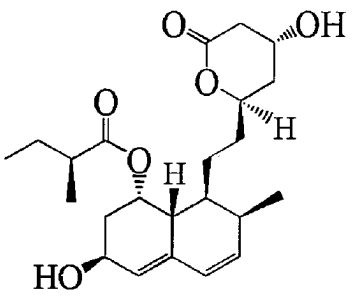
36. (currently amended) The process according to claim 28, wherein the compound (VIII-a) is ~~the compound (VIII-a)~~ obtained by opening the lactone ring of compound (VIII-b),

the compound (VIII-a) is a compound represented by the formula (VIII-a):



(VIII-a)

the compound (VIII-b) is a lactone form of compound (VIII-a) and is represented by the formula (VIII-b):



(VIII-b)

and wherein R^1 represents a hydrogen atom, a substituted or unsubstituted alkyl, or an alkali metal.

37. (currently amended) The process according to claim 25, wherein the treated product of the culture of the transformant is a treated product selected from cultured cells~~;~~, ~~treated products such as~~ dried cells, freeze-dried cells, cells treated with a surfactant, cells treated with an enzyme, cells treated by ultrasonication, cells treated by mechanical milling, cells treated by solvent[[;]], a protein fraction of a cell[[;]], ~~and an immobilized products of cells or treated~~ or immobilized cells.

38. (previously amended) A process for producing a protein, which comprises culturing a transformant obtained by introducing a recombinant DNA vector comprising the DNA having the nucleotide sequence shown by SEQ ID NO: 2 in a medium; producing and accumulating the protein according to claim 1 in the culture; and collecting said protein from said culture.

39. (currently amended) An oligonucleotide ~~corresponding to a sequence~~ selected from the group consisting of:

(a) an oligonucleotide consisting of 5 to 60 continuous nucleotides of SEQ ID NO: 2, and

(b) the complete complement of the oligonucleotide of (a) ~~in a nucleotide sequence selected from the group consisting of the nucleotide sequences shown by SEQ ID NOS: 2, 41, 43 and 44; or an oligonucleotide corresponding to a complementary sequence to said oligonucleotide~~.